

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A metrology device that detects the polarization state of an electromagnetic beam that is incident on a sample, said device comprising:

a polarization state generator, including an electromagnetic source that is a flash bulb that turns on and off to produce a pulsed electromagnetic beam with multiple wavelengths, wherein the polarization state generator produces a pulsed electromagnetic beam of known polarization state that is incident on the sample;

a spatially dependent polarizing element in the path of the pulsed electromagnetic beam that varies the phase of the pulsed electromagnetic beam spatially along a first direction;

a wavelength-dispersing component within the path of the pulsed electromagnetic beam, the wavelength-dispersing component separates the component wavelengths of the pulsed electromagnetic beam along a second direction; and

a multi-element detector within the path of the pulsed electromagnetic beam after the spatially dependent polarizing element, wherein the multi-element detector detects the intensity of the pulsed electromagnetic beam as a function of position phase along the first direction and as a function of wavelength along the second direction.

2. (Cancelled)

3. (Original) The metrology device of Claim 1, wherein the spatially dependent polarizing element comprises:

a spatially variable phase retarder; and

a polarizer after the spatially variable phase retarder.

4. (Original) The metrology device of Claim 1, further comprising a beam expander within the path of the pulsed electromagnetic beam before the spatially dependent polarizing element.

5. (Original) The metrology device of Claim 4, wherein the beam expander and the spatial dependent polarizing element are located in the pulsed electromagnetic beam path after interaction with the sample.

6. (Cancelled)

7. (Original) The metrology device of Claim 1, further comprising a synchronizer coupled to the electromagnetic source and the multi-element detector, wherein the synchronizer causes the multi-element detector to read out the intensity of the pulsed electromagnetic beam as a function of position when the electromagnetic source is turned off.

8. (Original) The metrology device of Claim 7, wherein the electromagnetic source produces a plurality of pulsed electromagnetic beams after the synchronizer causes the multi-element detector to detect the intensity of the pulsed electromagnetic beam as a function of position.

9. (Currently Amended) A method of ellipsometrically measuring a sample, the method comprising:

turning on and off ~~an~~ a broadband electromagnetic beam to produce a pulsed electromagnetic beam to be incident on a sample;

polarizing the pulsed electromagnetic beam prior to being incident on the sample;

producing a spatially dependent relative phase difference between the electric field components of the pulsed electromagnetic beam in a first direction;

polarizing the pulsed electromagnetic beam after a spatially dependent relative phase difference is produced;

filtering the wavelengths of the pulsed electromagnetic beam spatially in a second direction that is perpendicular to the first direction; and

detecting the intensity of the polarized pulsed electromagnetic beam at a plurality of positions as a function of the spatially dependent relative phase shift in the first direction and the wavelengths in the second direction.

10. (Cancelled)

11. (Currently Amended) The method of Claim 9, further comprising turning on and off the electromagnetic beam to produce a plurality of pulsed electromagnetic beams.
12. (Original) The method of Claim 9, further comprising expanding the pulsed electromagnetic beam prior to producing a spatially dependent relative phase difference.
13. (Original) The method of Claim 9, further comprising:
reading out the detected intensity of the polarized pulsed electromagnetic beam at a plurality of positions; and
synchronizing the reading out the detected intensity of the polarized pulsed electromagnetic beam with the turning off of the electromagnetic beam.
14. (Original) An apparatus for measuring a characteristic of a sample, the apparatus comprising:
a flash bulb light source that can be turned on and off to produce a pulsed electromagnetic beam with multiple wavelengths;
a polarizer in the path of the pulsed electromagnetic beam, wherein the polarized pulsed electromagnetic beam is incident on the sample;
means for producing a spatially dependent phase shift in the pulsed electromagnetic beam, the means for producing a spatially dependent phase shift producing a phase shifted beam wherein the phase shift is spatially dependent along a first direction;
means for polarizing within the path of the phase shifted beam, the means for polarizing producing a polarized phase shifted beam;
means for dispersing the wavelengths of the expanded pulsed electromagnetic beam along a second direction, the means for dispersing the wavelengths being in the path of the expanded pulsed electromagnetic beam; and
means for measuring the intensity of the polarized phase shifted beam as a function of the position-phase shift in the first direction and as a function of wavelengths in the second direction, the means for measuring being in the path of the polarized phase shifted beam.

15. (Cancelled)
16. (Cancelled)
17. (Original) The apparatus of Claim 14, the apparatus further comprising a means for expanding the pulsed electromagnetic beam, the means for expanding being in the path of the pulsed electromagnetic beam
18. (Original) The apparatus of Claim 14, wherein the means for producing a spatially dependent phase shift in the pulsed electromagnetic beam comprises a spatial variable phase retarder.
19. (Original) The apparatus of Claim 14, further comprising a means for synchronizing the means for measuring the intensity of the polarized phase shifted beam as a function of position with the turning on and off of the light source.
20. (Currently Amended) The apparatus of Claim ~~14~~ 19, wherein the means for synchronizing comprises a synchronizer coupled to the light source and to the means for measuring the intensity of the polarized phase shifted beam, wherein the synchronizer causes the means for measuring the intensity of the polarized phase shifted beam to read out data when the light source is turned off.
21. (Original) The apparatus of Claim 20, wherein the light source produces a plurality of pulsed electromagnetic beams after the synchronizer causes the means for measuring the intensity of the polarized phase shifted beam to read out data.

Claims 22-27 (Cancelled)

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